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SOURCE OF THE LITTLE FORK OF THE SASKATCHEWAN

THE
National Geographic Magazine

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SOURCES OF THE SASKATCHEWAN

By WALTER D. WILCOX

The Saskatchewan, one of the larger rivers of North America, takes its source in the rugged fastnesses of the Rocky mountains, and flows eastward over the sparsely inhabited plains of southern Canada till it reaches Lake Winnipeg. Save for a rapid at its mouth, the river is navigable for steamboats for about 1,000 miles. Strangely enough its two chief branches come from the same ice-fields in the high Rockies, and after diverging several hundred miles unite far out on the rolling plains about 900 miles from their source.

From the Canadian Pacific railway the easiest way to reach the headwater tributaries of the Saskatchewan is by ascending the Bow river to its source. My friend, Mr R. L. Barrett, and I left the station of Laggan on July 12, 1896, bound northward, in the hope of reaching the Athabasca pass and measuring the height of Mt Brown and Mt Hooker. For such an extensive journey, which would require two months to accomplish, we had five saddle-horses and ten pack-horses to carry our provisions and camp necessaries. To manage the horses and arrange our camps we engaged two skilled packers, Tom Lusk and Fred Stephens (the latter an expert axman) and also a cook.

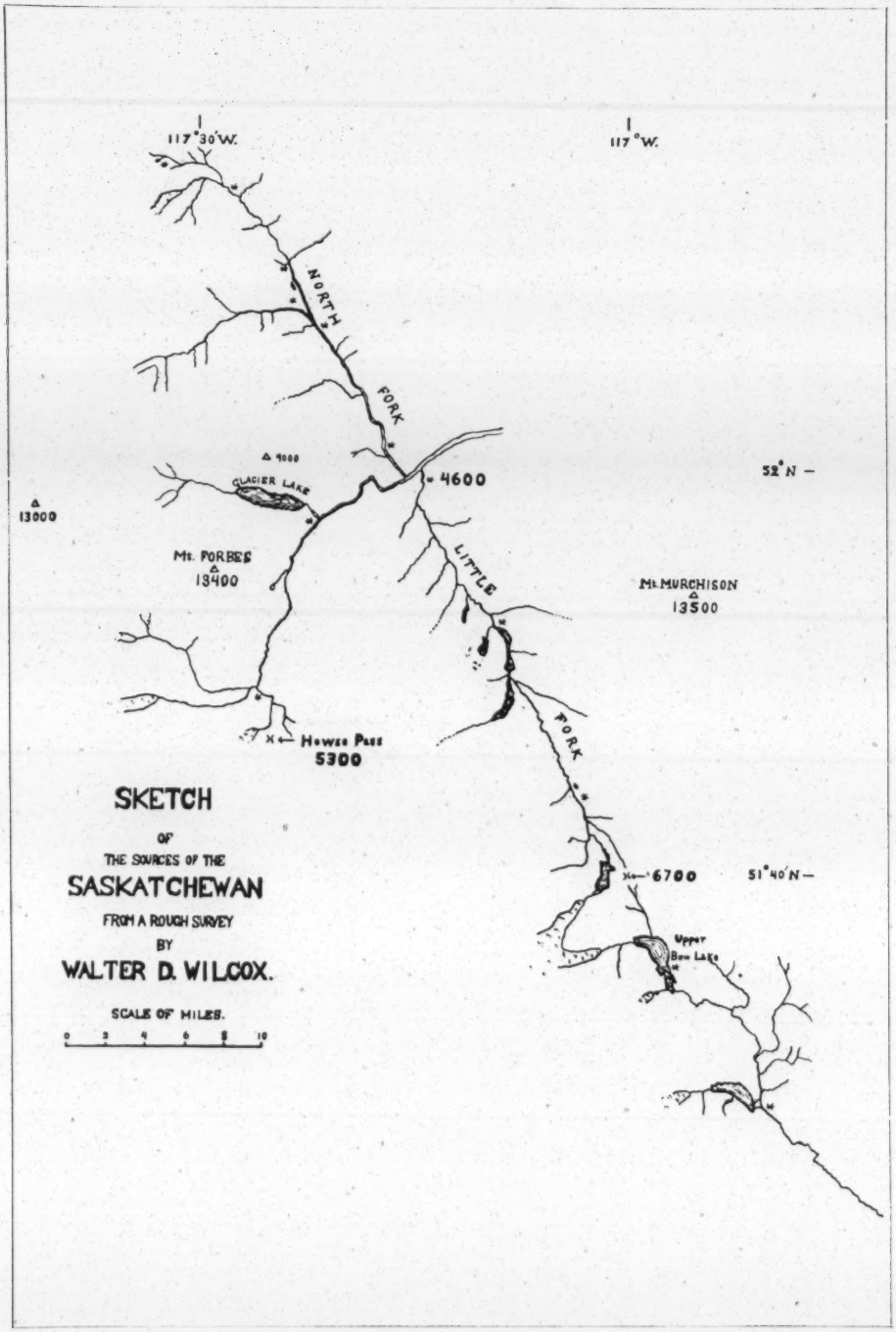
On the third march from civilization we came to the upper Bow lake, which is about 20 miles from the railroad. This lake, though only four miles long, has fine surroundings, being closely pressed by grand precipices hung with ice and frequently echoing to the thunder of avalanches, while its indented shores and green forests make it one of the most attractive spots in the

Rockies. A muddy stream descends from a glacier beyond the head of the lake and pollutes its clear waters, while a trout brook comes from an upland valley lying to the northwest, and this latter stream is perhaps the true source of the Bow. Up the valley countless springs and melting snowbanks, with large tracts of swampy land, contribute their waters from every side. The level of the valley rises into a gently sloping plain, the last rivulet is passed, and one stands on the divide overlooking the Little Fork of Saskatchewan river.

Those who have reached this region have had an opportunity of seeing one of the grandest views that the mountains offer. Far to the west are the lofty peaks of the highest range of the Canadian Rockies, buried in perpetual snow and discharging their surplus ice by glaciers in every lateral valley. Deep set amid dark precipices, such a glacier is to be seen west of the pass. From two cavernous ice-tunnels a large stream issues and sweeps in a devious course over a barren gravel-wash for a mile or more, till it enters a lake. Then, as the clear stream leaves the lake and winds away to the northwest, it is lost to view, hidden amid deep forests, and only reveals its course here and there where it expands into one or another of the many lakes which this valley contains. Between the spurs of the summit range on the west and a parallel range on the east, the great trough or valley which carries the Little Fork and the North Fork of the Saskatchewan draws away in a nearly straight line for more than 60 miles, till it is lost in the blue haze of distance.

The summit of the pass is a delightful region, situated at an altitude of 6,700 feet, or only 300 feet below tree-line. The woodland is consequently rather open and abounds in meadows, while the spruce trees, many of which must be four or five centuries old, have that symmetrical beauty of form rarely seen where there is less space and light in the crowded forests of the deep valleys.

It seemed best to camp on the summit, as a forest fire had broken out in the Little Fork valley some miles distant and was sweeping furiously up the mountains to the east. Mr Barrett and one of the packers spent the next day in making a horseback excursion to investigate the extent of the fire and see if there was a way through. They returned in the evening, after a hard day's travel, without having reached the fire. It was evident that the distance had been much underestimated, perhaps owing to the great extent of view from the pass; but it was


117°30'W.
117°W.
NORTH
FORK
GLACIER LAKE
4600
52°N
13000
Mt. FORBES
13400
LITTLE
Mt. MURCHISON
13500
Howse Pass
5300
FORK
6700
51°40'N
Upper
Bow Lake
SKETCH
OF
THE SOURCES OF THE
SASKATCHEWAN
FROM A ROUGH SURVEY
BY
WALTER D. WILCOX.
SCALE OF MILES.
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SCENE ON THE LITTLE FORK OF THE SASKATCHEWAN

small comfort to know that the fire was farther off than had been supposed, as we had to change our idea of its magnitude. As there was nothing to be gained by waiting, we moved a short march into the valley the next day.

The descent into the Little Fork valley is much steeper than on the other side of the pass, and in the first three miles the trail drops about 1,000 feet. These mountain trails were used by the Indians long before the whites came into the country. In every important valley, especially where game abounds, there are trails which prove of great value to the traveler.

As our horses were winding through a deep forest, a bird appeared which resembled a pine bullfinch, flitting from tree to tree and following us closely. Somewhat later it gave the most remarkable instance of tameness that I have ever seen. Having followed us for about two miles, it waited in a tree during the bustle and confusion of making camp, but in the afternoon, when all was quiet and some of our men were asleep, the bird became exceedingly familiar, walking on the ground near us and finally perching on our extended hands. It was soon evident that the object of our visitor was to catch mosquitoes, which were hovering in swarms around our heads. It pecked at a ring on my hand, at our needles, and in fact any metal article, but the climax was reached when by accident the bird saw its own image in a small looking-glass which lay on the ground. Then, with extended wings and open bill, it uttered cries of rage and pecked madly at the glass in which an enemy appeared. Among the solitudes of mountain forests squirrels, finches, and whiskey-jacks often show unusual confidence in man, but this particular instance is remarkable, because the bird would alight on our persons even after it had been momentarily though gently detained several times as a prisoner in my hand.

Further investigation showed that it was possible to get our horses through the fire, which had spent its energy on a large extent of green timber, so after three hours' travel from camp we came to the burning trees, where the fire was advancing slowly, as there was a calm. Then came several miles of the recently burned area, now changed to a forest of blackened sticks, some of which were already fallen, with here and there a column of smoke rising from smouldering moss, and everything half concealed in a snowy covering of ashes. At the other edge of the fire there was more danger, and frequently some tree would flash up and send a scorching heat toward us. We were chiefly anx-

ious that the packs should not take fire and cause a stampede among the horses, so for a considerable distance we drove our animals along the edge of a lake and frequently waded deep in the water to avoid the heat of blazing trees.

After an exhausting march of six hours we made our camp in a muskeg, or swamp, about half a mile from the fire. The wind, however, which had been increasing for a time, began to carry the fire toward us, and our situation soon became alarming when some heavy timber began to blaze and the columns of flame, shooting hundreds of feet into the air, made a terrifying roar, which caused our horses to stop feeding. At one time a funnel-shaped whirlwind about 200 feet high formed over the heated area and remained there a few moments.

At the rate of progress the fire was making, we should soon have been surrounded had we not packed up and moved a mile further down the valley. The second camp was made by the side of a considerable stream, wide enough to stop the fire; but toward evening cloud banners began to form at the peaks of the mountains, and next day, after many weeks of drought, rain fell steadily for ten hours and fortunately extinguished for a time the fires that were destroying this beautiful valley.

We were now two days' journey down the Little Fork valley, a distance of about 18 miles in a straight line. We remained in camp the next day to do a little survey work from a mountain to the east. From this point, at an altitude of 8,000 feet, the Little Fork valley appears straight, deep, and comparatively narrow, with a number of lateral valleys coming in from the west side and cutting the mountain masses into projecting spurs. The strata of the mountains are for the most part nearly horizontal, and the cliffs are frequently almost vertical. There were six lakes in view from our survey point, of which two, each about a mile long, were merely expansions of the river, three were in lateral valleys, and one lay far up the valley where the river takes its source. The lateral valleys head in the summit range to the west and probably have never been visited.

The scenery is very grand near the lakes. A striking peak about 10,000 feet in height, with a precipitous rock face and wedge-shaped summit, stands guardian, and, together with the jagged mountains near it, helps to give a gloomy, fiord-like appearance to the region. Mt Murchison is supposed to lie in a group of mountains to the east of this place, and, as seen from the Pipestone pass by Dr Hector, was estimated to be 13,600

feet high. It has never been seen from the Little Fork valley, though it cannot be more than 10 miles distant.

On July 22 we marched six hours, and reached Saskatchewan river. The trail is very good, and runs for many miles through forests of splendid timber, especially in the great valley of the Saskatchewan. At the forks or junction the Saskatchewan is a rapid stream about 150 yards wide and apparently quite deep, and the pure blue waters of the Little Fork are soon lost to view in the muddy volume of the main river. The Saskatchewan valley is about four miles wide at this point, the river itself flowing between bluffs of glacial drift, and while the massive mountains on every side are between 10,000 and 12,000 feet high, they are less imposing than usual because of their distance. The main river runs about northeast, cutting through the mountain ranges, and taking its source to the southwest among the highest glacier-bearing peaks of the summit range.

A very large tributary, which we called the "North Fork," comes in from the northwest and joins the main river about one mile above the Little Fork. This river is not correctly placed on Palliser's map, nor was there any available information about the region whence it comes. Even Stony Indians who travel through these mountains know little of this river, because, it is said, many years ago one of their tribe was lost while hunting in that region, and they think he was destroyed by an evil spirit dwelling there. At all events, they will take no chances in visiting that part of the country now.

Our route to the Athabasca, however, lay up this river, and our first duty was to find a ford across the Saskatchewan. A day was spent in finding a safe place, as the river was in summer flood, though not at its highest stage. Mr Barrett, with characteristic energy, discovered a ford about one mile upstream, where the river spreads out among low sand islands to the width of nearly half a mile.

A sense of relief came when, the next day, after fording the turbulent Little Fork, we had crossed the main river, which is of great size at this point, only 30 miles from its most distant source, and were safely on its north side. Turning northward along a high bluff, we came in a short time to the North Fork, which appears to equal the so-called Middle Fork or main river. About one mile above its mouth the North Fork flows between rocky banks, and there is a fall or rapid in a constricted channel blocked by immense masses of fallen cliff, where the water surges

CAMP SCENE ON THE NORTH FORK OF THE SASKATCHEWAN

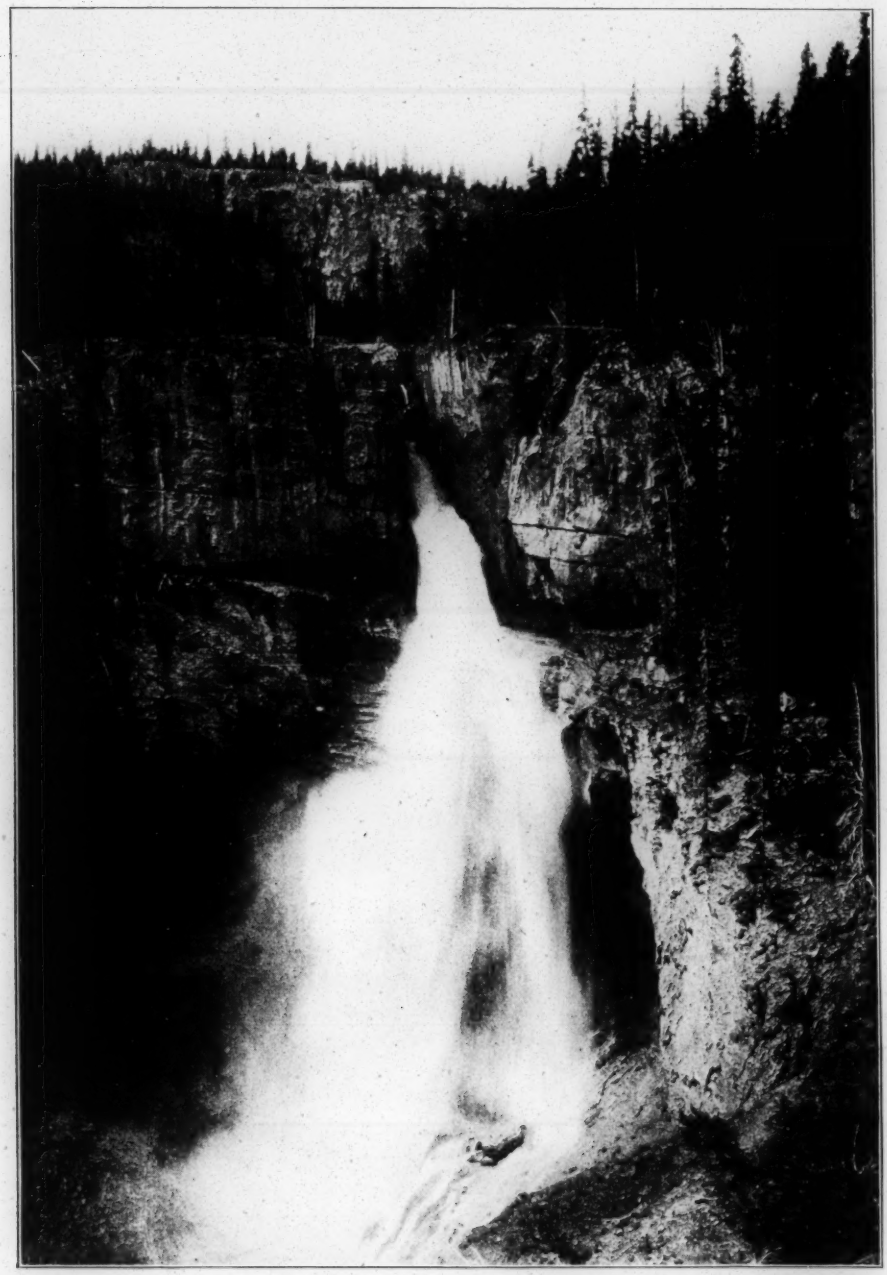
in foaming breakers and dark whirlpools. For a mile or so above this fall there is a fine trail through a light pine forest, and then comes a burnt area with trees crossed in such confusion that it required two hours to make half a mile, and we were so much delayed here that our progress for the day could not have been more than three miles in nearly six hours.

On the following two days we advanced about 10 miles up the valley, having a trail wherever there were green forests, but suffering much delay from burnt timber and muskegs. On one occasion when marching along a steep bank of the river a packhorse stumbled among loose logs and rolled over into a deep pool. The horse was carrying over 200 pounds of flour, a burden that kept it for a short time at the bottom of the river, but after some violent struggles it came right side up and climbed out. No damage was done, however, as flour absorbs water only to a slight depth and very soon makes an impervious layer on the outside.

Ten miles up the river a stream from the west unites with the North Fork. As the two streams are about equal in size we were at a loss which one to follow in order to reach the Athabasca. In order to get a more extended view of the country, an ascent was made of a mountain which lies between the two rivers. On the summit, at an altitude of 8,400 feet, it was seen that the western stream takes its source in a large glacier about 12 miles distant. A fair idea of the branch streams was given by the valley openings, but it must be confessed that less is known about this river than of any other source of the Saskatchewan under discussion. As a result of this ascent we were firm in the belief that our route did not lie up the western branch. The other valley, however, seemed exceedingly deep, canyon-like, in the very short distance that it was visible at all. Though the air was smoky from forest fires, in spite of considerable rainy weather of late, I tried some photographic work, and during a brief but fatal moment, when I was reaching for a plateholder, the strong wind blew my camera over and broke it badly on the rough limestone rocks. The most fragile parts, the ground glass and lens, fortunately escaped, while the wood and brass work were in pieces. With a tool box carried for such emergencies the camera was reconstructed after a few hours' labor and did excellent work later in the trip. Our men returned in the evening and reported that there was a trail in the deep valley to the northwest.

The next two days we advanced only about ten miles because of the uncertainty of the trails, the rough nature of the forests, and repeated crossings of the river. Our progress was slow in spite of our custom of having one or two men explore and cut out the trail for the next day as far as possible each afternoon. In this place the river is at the bottom of a narrow valley, the sides of which are smooth precipices adorned here and there by clumps of trees clinging to the ledges. Streams and springs from far above come down in delicate curtains of spray or graceful waterfalls wafted from side to side by every breeze. The flood of glacial waters sweeps over a gravel-wash in a network of channels, with the main body of water swinging from one side to another of the valley and washing against steep or inaccessible banks. This condition of things caused us to cross and recross the stream almost constantly, and, though the fords were in general not more than three feet deep, the icy waters ran with such force that our crossings were not without excitement. In spite of the best judgment and care of our packers horses got beyond their depth several times and had to swim across. As the saddle-horses are guided by riders, they rarely lose their footing, but the pack-animals, coming along in a bunch, confused by the shouting of the men and the roar of the rapids, hesitate and often enter the river a little above or below the best ford, and so get into deep water. Dangerous rapids or a log jam below make such occasions critical, not alone for the safety of the horses, but even for the success of an expedition in case a large quantity of provisions is lost. Pack-horses cannot swim very far with their tight cinches, and moreover the icy waters of these mountain streams paralyze their muscles very quickly.

The trail at length leaves the river and makes a rapid ascent through forests on the east side of the valley, so that in an hour we had gained 1,000 feet. Through the trees we caught glimpses of magnificent scenery, the uniting streams in the canyon bottom, the mountain sides heavily timbered or rising into snow summits, and to the west an immense glacier, which was the source of the largest stream. The North Fork was rapidly dividing into its ultimate tributaries. The sound of mountain streams falling in cascades, the picturesque train of horses, each animal cautiously picking a safe passage along the rocky pathway; the splendid trees around us, our great height, and the tremendous grandeur of the mountain scenery, all helped to make our surroundings most enjoyable. Above the sound of



FALLS ON THE NORTH FORK OF THE SASKATCHEWAN

wind in the forest there was presently heard the roar of a waterfall, and half a mile beyond we saw a large stream apparently bursting from the top of a fine precipice and falling in one magnificent leap down a great height. Through a notch in the mountains there was another fall visible some miles distant fully twice as high as the one near us. It was learned later that every stream descended into the canyon by a fall and a succession of cascades.

We camped in a beautiful wooded valley with much open country at an altitude of 6,300 feet above the sea. Near our tents was the river, which at this place is a comparatively small stream of crystal clear water. In the afternoon I ascended, with one of the men, a small mountain which lay to the west of our camp. From this summit two passes were visible, one five miles to the north and the other more distant and toward the northwest. The view to the west was more extended. There was a large straight glacier directly before us, the one we had seen earlier in the day, which supplies the greater part of the water of the North Fork. At least six or seven miles of this glacier is visible, and it may extend much further behind the intervening mountains. The glacier has no terminal moraine, and slopes by a very even grade to a thin knife-like edge, in which it terminates.

The next day Mr Barrett went off to climb, if possible, a mountain over 11,000 feet in altitude, north of our camp, while one of the packers and I started to explore the pass to the northwest. The other packer spent part of the day investigating the other pass. This division of labor was a great saving of time. At our conference that evening, which did not occur till midnight, when the last member came into camp, it was decided that the pass to the north seemed unfavorable as a route to the Athabasca. Mr Barrett failed in his ascent because the mountain was more distant than it appeared. The pass to the northwest was more favorable, and on the next day we moved our camp so as to be almost on the summit. The last and longest branch of the North Fork comes from a small glacial lake on one side of a meadow-like summit and at the base of a splendid mountain, a complex mass of rocky arêtes and hanging glaciers.

Upon further inquiry we learned that the valley as it descended to the northwest was blocked by a glacier that came into it, and beyond that a canyon, which made this route altogether out of the question. A high valley on the right, however, offered the last and only escape for us, and after reaching an altitude of

8,000 feet our descent began into a valley that we knew must be either the Athabasca or the Whirlpool river, which flows into the Athabasca. Thus the most critical part of our expedition, the discovery of a pass from the Saskatchewan to the Athabasca, was safely accomplished. It is highly probable that ours is the first party to go over this route. Though now twenty-six days out from Laggan, we were only a little more than half way to the Athabasca pass, but a description of that country would carry us beyond the subject in hand.

It was not until late in the season of 1898 that I had an opportunity to visit the source of the Middle Fork of the Saskatchewan. For this trip I engaged as packer William Peyto, a man who had proved very efficient on previous expeditions; also a cook and an outfit of nine horses.

It seemed almost foolhardy, when on October 12, against driving snow showers and a cold wind, we set out from Laggan and once more resumed our toilsome march through the many miles of burnt timber northward, as it were, into the very teeth of winter. Through constant snowstorms—for the headwaters of the Bow are a breeding place for bad weather—we passed the upper Bow lake, the divide beyond, and got six miles down the Little Fork on the third day, as a result of forced marches. During the following night there was a curious creaking sound of the tent ropes and a sagging of the canvas, and in the morning our prospects for a successful trip were very gloomy indeed, with ten inches of new snow on the ground. Not wishing under these circumstances to get further away from civilization, we remained in camp all day. By afternoon the snow ceased, and the next day we were again on the march. The snow was fifteen inches deep in the Little Fork valley, but only half that depth near the Saskatchewan, which we reached on the sixth day.

On October 18 we crossed the Little Fork and turned westward into a region that promised to be full of interest. The weather, which had been cloudy and threatening for some days, now gave signs of improvement by the appearance of blue sky in the west, and soon after the high mountains up the Middle Fork were bathed in sunlight, the dazzling light on the snow-covered landscape being very cheering after the days of gloom and storm. The trail penetrates a forest on the south bank and, frequently coming out on the river, allows views of the wide, log-strewn gravel-wash, the work of summer floods.

About five miles up the river a valley comes in from Glacier lake, and our camp was placed on a point of land between the confluent streams. The Saskatchewan at this cold season is clear as a mountain spring and shallow enough to be fordable on foot. In summer, however, it is a raging flood that makes the region of Glacier lake very difficult to reach. From our camp I set out in the afternoon to see the lake, and found it in an hour, though not without a hard scramble through deep snow and fallen timber. The view was well worth the labor expended. The lake, which is three or four miles long, is beautifully set among high peaks, and at the farther end a snow mountain sends down a glacier nearly to its level. The setting sun sinking into a notch of the distant mountains poured shafts of light through gray, misty clouds and tinged their edges with a pale golden illumination. The lake was nearly calm and reflected the beautiful picture of mountain and sky from a tremulously moving surface. The water, by retreating from its summer level, had exposed a wide margin of mud-covered boulders and slippery logs—the trunks of trees carried into the lake by snow slides—but in the distance the forested banks seemed to press close upon the water. There was something wonderfully impressive in the awful solitude of such a scene under the spell of evening calm.

From what had been seen of the country I decided that it was important to reach, if possible, the summit of a high mountain that lay to the east of the lake, which from its position would command a comprehensive view of the whole region and also surely reveal Mt Forbes, which was somewhere west of the lake, according to Palliser's map.

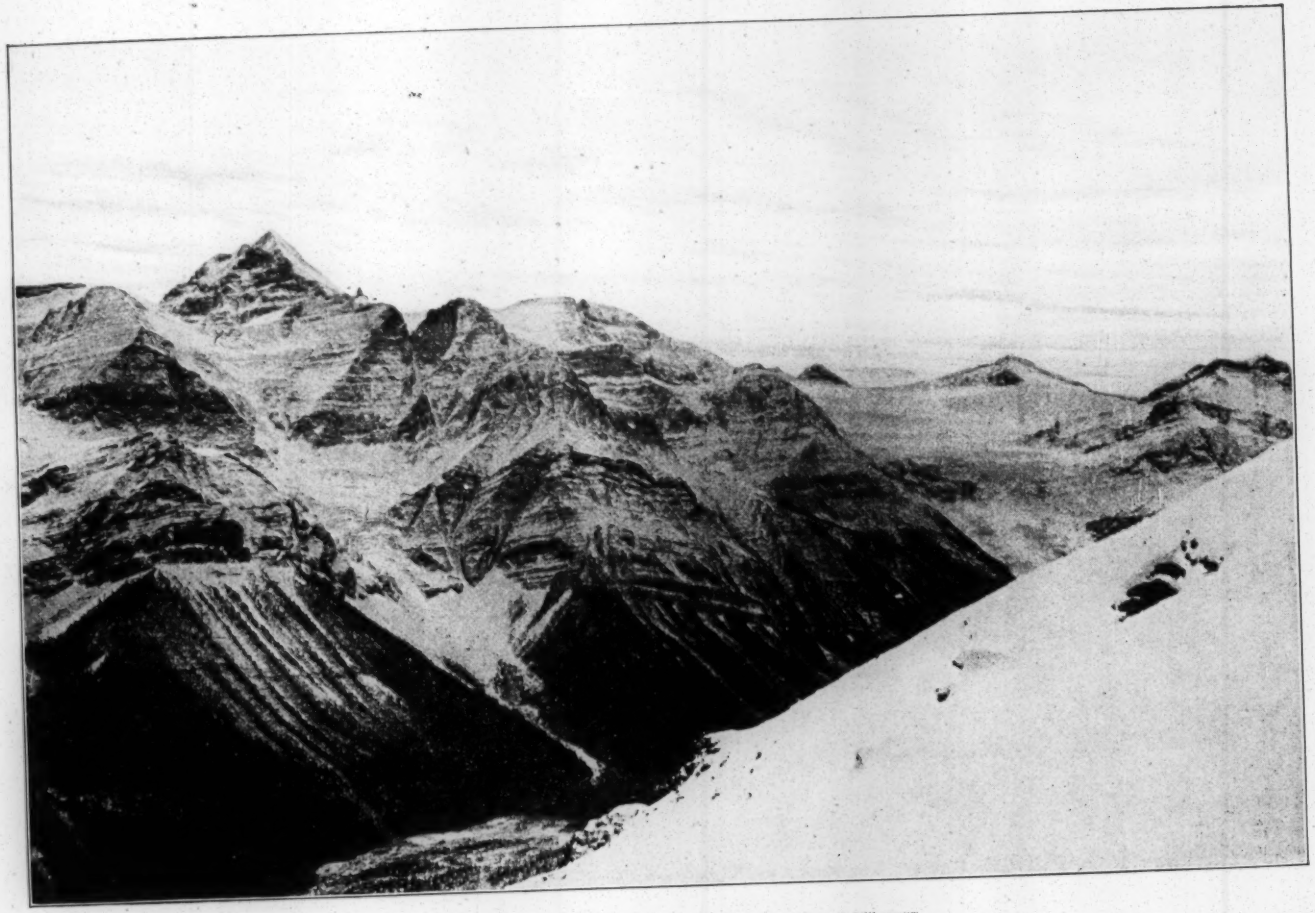
Accordingly I was afoot the next morning at nine o'clock, with a camera on my shoulders, ready for the ascent. The mountain appeared to be about 7,800 feet in altitude, or in round numbers 3,000 feet above our camp. The weather was bright and cold, nor was there a cloud in the sky, and it proved by far the best day of the trip. It appeared that the walking would be better on the other side of the Glacier Lake stream, and after some ineffectual attempts to bridge the river by felling trees, Peyto carried me across on his back in a shallow place, and so the climb was commenced with dry boots. In less than five minutes a fine trail appeared, which saved a great deal of labor and considerable time in getting to the lake. The trail at length diverged to the east toward the mountain and went in the right direction until the altitude was 600 feet above the lake, effecting

a great saving of energy in forcing our way through the underbrush. The sunlight was painfully brilliant on the snow, which was fully a foot in depth at 7,000 feet. At this altitude, in a last clump of spruce trees, I hung my camera to a branch and took a short rest, as the climb so far had been very exhausting.

After a pause of ten minutes the sharp air urged a recommencement of the ascent. The brilliant glare of an hour previous had given place to a somewhat cloudy sky, as a belt of heavy cirrus was drifting along over the mountains in a great line running north and south. The sun shone through it feebly, and was surrounded by a halo. I soon began to have doubts of my ability to succeed in the ascent, as my strength began to fail under so much exertion in the deep snow. The bushes, rocks, and other inequalities of the ground were buried, so that I frequently stumbled and fell. Moreover, it now became apparent that the size of the mountain had been much underestimated, for the heights on the right rose tremendously even after an altitude of 7,500 feet had been reached. The inclination was very steep, and the glare of the now returned sun on the vast expanse of snow and the absence of anything to fasten the eyes upon for relief produced a curious sensation of dizziness, due perhaps in part to exhaustion. I felt, however, the importance of reaching the summit, as it meant practically the success of the entire trip. Moreover, the extraordinarily fine weather on this critical day of the trip seemed too providential to be lost from any lack of exertion or ambition.

Summoning, then, all my resolution, I made reasonable progress for a time, but soon, in spite of every eager desire for success and ambition to reach the summit, the contest between will-power and tired muscles became doubtful, as the snow grew deeper with higher altitude, the slope steeper, and the far-off summit seemed no nearer. Every few yards of progress was invariably terminated by a fall in the snow, and it seemed better to rest for a moment in whatever position chance had it than to get up at once.

A little later a view appeared that in itself well repaid the labor of the climb. On the right was an expanse of spotless snow, exceedingly steep, vast in extent, and dazzling in brilliancy. Its rounded contours were sharply outlined against the sky, but there was no interruption of stone or cliff in the monotonous covering of snow, nor any scale by which to judge of size or distance. The chief object of interest in the view was a



VIEW OF MOUNT FORBES FROM AN ELEVATION OF ABOUT 9,000 FEET

snowy, triangular peak covered with ice, which now began to appear in the west. The colors of rocks and cliffs in the distant peaks and precipices seemed absolutely black in contrast with the remarkable whiteness of the snow surface on all sides. Overhead the sky was intensely blue, but marked by distinct wisps of white cirrus cloud, spun out like tufts of cotton into shreds and curving lines.

At an altitude of 8,800 feet, or more than 4,000 feet above our camp, I at length reached the summit of the mountain crest. It was necessary to walk along the crest a quarter of a mile to reach a somewhat higher point, which was the true summit. The snow along this mountain ridge was in many places three or four feet deep, and, mindful of the terrible alpine accidents caused by cornices, I kept well away from the edge, below which it seemed to drop sheer several thousand feet. The snow was sparkling in the sun, and of the myriads of bright points about one-half were merely white light, like diamonds; the other half were either green, blue, or amber-colored, like emeralds, sapphires, and topazes. From intense frost my gloves were frozen so stiff that notes and sketches had to be done with bare hands.

The most conspicuous and interesting part of the whole vast panorama was the lofty summit of Mt Forbes, beyond the valley of Glacier lake. This mountain and another about 10 miles to the west were the two highest peaks in sight, and each is probably between 13,000 and 14,000 feet in altitude. Glaciers of very large size come from these mountains and terminate a few miles above the lake. The whole valley of the Saskatchewan to its upper end and in the opposite direction for many miles below the mouths of the North and Little forks was clearly visible. There was a very high rocky peak in a group of mountains east of the Little Fork that occupies the position of Hector's Mt Murchison, which he calculated to be 13,600 feet high. This mountain is hidden away in a group that must be 75 miles in circumference, and so it is rarely seen. There was a fine view to the north, where a wild and desolate valley, thousands of feet below, was dominated by a castle-like mountain over 11,000 feet high, probably Mt Lyell, cut in ruins like ancient towers and battlements. Of four plates exposed on this mountain only one was successful, so I had a narrow escape from failing altogether in getting a view of Mt Forbes, which, because of its great height, is veiled from view by clouds and is frequently invisible for weeks at a time.

On Thursday, October 20, the day broke gray and unsettled, with the highest mountains touched by clouds. We continued our march up the Saskatchewan valley, and urged the horses rapidly over a level gravel plain at such speed as to make in all ten miles. On the west side of the valley there is a stupendous wall of rock between 11,000 and 12,000 feet high, which terminates in the giant peak of Mt Forbes, a little to the north. About four miles from our camping place there is a group of curious rounded hills rising like forested islands from the sea of gravel.

There was a strong raw wind against us, and because of our water-soaked boots, half frozen by contact with snow, it was altogether too cold to keep in the saddle long, and every one walked most of the time. We made camp in a miserable place of stunted timber half killed by gravel which had been washed over the place by some change of the river's course not many years before. The river here divides into three streams. The smallest, near our camp, comes from the Howse pass, less than three miles distant; the other two come from a valley to the southeast, all, curiously enough, flowing on different sides of a flat valley. In the afternoon I walked some three miles up the valley to where the lesser stream comes in from the west, and as it heads at the base of Mt Forbes, I followed it a mile or so farther, till presently the current became rapid, the valley narrow, and the water closely hemmed in by rocky banks, so that walking was very difficult. The snow was a foot deep in this little valley, where the sun and wind could not exert their influence as in the open. The stream on the other side of the valley is larger and comes from a glacier several miles distant. This whole region was very thoroughly examined last summer by Messrs Baker, Collie, and Stutfield, who not only explored the large glacier, which is supposed to be 10 or 15 miles long, but went up the other stream several miles to the base of Mt Forbes, in the hope of ascending it. The flood of waters that sweeps down here in summer from the long glacier has cut channels three or four feet deep, lined with immense boulders, across the whole bottom of the valley. This is the chief stream or source of the Saskatchewan.

During the night the wind came up in fitful gusts; the stars were no longer bright points, but foggy spots seen through a thin mist; bands of cloud swept along the mountain sides almost as low as our camp, and at length the whole sky was overcast. The barometer was much lower at midnight. By 1 a. m. snow began

to fall, which was a cause for no little apprehension, as we were far from the railroad.

On Friday, October 21, the sky was still threatening, though very little snow had fallen. We were on the march soon after ten o'clock, and reached the summit of the Howse pass in an hour. This pass was made known to the traders of the North-west Fur Company about 1810 by a man of the name of Howse or Hawes, and was at one time much used by the Kootenai Indians, who came over the mountains and bartered with the fur-traders at a place about three days' journey down the Saskatchewan, now known from this circumstance as the Kootenai plain. This route is now impassable, as fire has run through the forests in the lower part of the Blaeberry valley, and the timber has fallen for many miles. The pass itself is about 18 miles from the Little Fork and 5,300 feet in altitude.

At this point we were seven days' journey from the railroad by either of two routes, the one by which we had come, or another, which, by going down the Blaeberry one day's march and then over a pass to the southeast, would bring us to the Kicking Horse river, and so to Field, in British Columbia. The latter route seemed preferable, as it would be through a new region.

The descent into the Blaeberry is one of the most trying exploits that the mountains offer. We commenced to descend rapidly the channel of a brawling mountain torrent, crossing from side to side constantly, so that our horses were compelled to climb up and down steep banks, to scramble over immense logs, or sometimes to force a way down the boulder-strewn bed of the stream. As there was no trail, Peyto had to lead the way by whatever route appeared best, and in several places our horses had to slide on their haunches down steep banks forty or fifty feet high, jump into the torrent, cross it, and then ascend a similar bank on the other side at the greatest risk of accident and to the no little trial of our own nerves. A trail appeared after three hours of such labor, and we camped about ten miles down the valley. It rained hard all night, turning to snow in the morning.

On Saturday, October 22, we followed a branch stream which comes in from the southeast for a mile or so, and then ascended 2,600 feet without a trail through a heavy forest. The snow, which was hardly apparent in the Blaeberry valley, became eighteen inches deep near the tree-line. Snow also fell at frequent intervals throughout the day and shut out the landscape, so that our bearings were mostly by compass. Almost at night-

fall and in desperation we camped in the depths of a heavy forest on the mountain side. The snow was very deep and the temperature low, so that it was all the harder for our horses, which had to be turned loose in the timber with no chance to feed. The heavily laden spruce trees sent down avalanches of snow at every stroke of the ax, so it was very difficult to keep our camp-fire going, which was the more important as we had no water except by melting snow.

On Sunday, October 23, the weather was still cold and threatening. It was very hard work packing up, as all the ropes, canvas covers, tents, and blankets were frozen stiff and covered with granular ice. Our horses looked very thin after their recent hard marches and little or no feed. They were hungry enough to bite off twigs and woody branches from the bushes which had a few buds on them. We did not get off till nearly noon, and then continued a traverse of the forested mountain side with a constant gradual descent in the hope of reaching a valley bottom that leads to the pass. We had no sooner started than a heavy snowstorm set in, shutting out everything from view. There was no trail, as the pass had never been used before this summer. In about two hours we reached a valley bottom that we supposed to be the right one, though Peyto, who had taken the only other party through that ever crossed this pass, did not recognize it for some time. The deep snow and the constant ascent were very trying to our famished horses. One or two of us went ahead all the time and broke trail for them, but in spite of this some of our pack-animals lay down in the snow exhausted and groaned pitifully. We at length reached the summit and camped half a mile beyond. The snow was 24 inches deep on the level, and in depressions of the ground it was between three and four feet. Here our horses got a little grass by pawing away the snow, a trick that they learn during the hard winters on the plains.

We were now at the head of the North branch of the Kicking Horse river, and it was practically a constant descent to Field, where we arrived in three days, after having been out seventeen days. On this excursion every camp but the first was made on snow-covered ground, and there were only three days on which some snow did not fall. No small measure of our success was due to the splendid outfit of horses supplied by Mr T. E. Wilson, of Banff, who gave me the pick of his pack-animals. Very much depends on the training and strength of the horses in a rough country, where countless obstacles have to be overcome,

WINTER SCENE ON PASS BETWEEN THE BLAEBERRY AND THE NORTH BRANCH OF THE KICKING HORSE RIVER

fallen trees passed over, swamps and rivers crossed, the close-set mazes of deep forests penetrated, and a pathway carefully selected over the treacherous holes of loose rock-slides. To seize the exact hour or day, amid the changes of fickle weather, the veiling smoke of forest fires, and blinding snowstorms, that a particular journey or mountain ascent may be accomplished rests in no small measure on the experience of the pack-horse, and it is a cause for little wonder that the traveler soon learns to take a certain pride in the faithful beasts which often do service at the sacrifice of their lives.

Speaking generally of the headwaters of the Saskatchewan, the valleys are well wooded, the mountains very high for this part of the Rockies, and large areas are covered by snow-fields or glaciers. The general character of the scenery is remarkably grand and unfailing in variety of mountain forms, so long as the valleys are the point of view. When viewed, however, from high summits it is somewhat monotonous, due to the fact that thousands of mountains are visible in the grand panorama, all quite uniform in height, among which the higher peaks that are 11,000 or 12,000 feet above sea-level are apparently lost.

All the larger streams come from glaciers, and consequently reach their highest stage during the hottest weather. Their waters are turbid with glacial mud, and they undergo a rise by day, when the sun melts the ice, and a fall at night, when freezing commences. The region of the Middle Fork, especially near Glacier lake and the base of Mt Forbes, is one of the grandest and most imposing, not only in the Rockies, but possibly in any mountain region of the world, even under gloomy skies and in the desolate garb of winter. In this region are some of the highest mountains between Montana and the Athabasca pass.

The forests which clothe all the mountains up to a height of 7,000 feet above sea-level are chiefly of Engelmann's spruce and balsam fir, with occasional areas of jack pine. The beautiful Lyall's larch, characteristic of the mountains farther south, was never seen in these valleys.

The summer season, which usually begins in June and lasts till September, is too short for extensive geographical work, so that much remains to be done in the way of exact measurement of mountains and glaciers. However, the very fact that travel among these mountains is still for the most part purely exploratory adds not a little to the pleasure of visiting a region of such exceptional grandeur.

EXPLORATION IN THE CANADIAN ROCKIES

At a meeting of the Royal Geographical Society, held at the University of London on February 13, Professor Norman Collie read a paper entitled "Exploration in the Canadian Rockies: a Search for Mount Hooker and Mount Brown." Professor Collie's paper dealt with two journeys taken during 1897 and 1898 through that part of the Canadian Rockies which lies between the Kicking Horse pass on the south and the source of the Athabasca river on the north. The most interesting problem connected with the first journey which presented itself to Professor Collie and his party was whether a lofty mountain—probably 14,000 to 15,000 feet high—seen from the slopes of Mount Freshfield, from which it lay distant about 30 miles in a northwesterly direction, might be Mount Brown or Mount Hooker, which were supposed to be 16,000 feet and 15,000 feet respectively. Professor Coleman, in 1893, starting from Morley, had arrived at the true Athabasca pass, found the historic Committee's Punch-bowl, and his brother had climbed the highest peak on the north, presumably Mount Brown. This peak he found to be only 9,000 feet. The question presented itself,Could he have been mistaken or was it possible that there existed two Athabasca passes? Professor Collie and his companion returned to their camp on the Saskatchewan pass without having solved the question of either Mounts Brown and Hooker or the Committee's Punch-bowl. It was finally settled on the return to England by reference to the journal of David Douglas, the naturalist, dealing with his journey over the Athabasca pass. From the authentic account of the two mountains there given, it was seen that the credit of having settled with accuracy the real height of the peaks belonged to Professor Coleman. For nearly 70 years they had been masquerading in every map as the highest peaks in the Rocky mountains. No doubt now remained as to where Brown and Hooker and the Punch-bowl were. That Douglas climbed a peak 17,000 feet high in an afternoon (as narrated in his account) was impossible; the Mount Brown of Professor Coleman, 9,000 feet, was much more likely. There was only one Athabasca pass, and on each side of its summit might be found a peak—Mount Brown, 9,000 feet, on the north—the higher of the

two—and Mount Hooker on the south. Between them lay a small tarn, 20 feet in diameter—the Committee's Punch-bowl. The peaks to the south, among which the party wandered last August, were therefore new, and they probably constituted the highest point of the Canadian Rocky Mountain system.

HOW LONG A WHALE MAY CARRY A HARPOON

In a lecture before the National Geographic Society on February 21, 1895, the Hon. George C. Perkins, U. S. Senator from California, mentioned the fact that a "toggle" harpoon head which he exhibited, and afterward generously donated to the Society, had been obtained from a whale in Bering sea. The harpoon bears the following inscription:

M O N T o o o o o

The first four letters are the mark of the American whaler *Montezuma*, which was engaged in whaling in Bering sea and the North Pacific about 1850–'54. The five circles represent the number of the boat to which this particular iron was assigned. Taking the latest date (1854) as the date when the whale was struck, it appears that the whale must have carried it thirty-six years. The following abstract of Senator Perkins' remarks gives some of the circumstances:

"The harpoon was perfect, as you see it, and in a splendid state of preservation, but the shank had been eaten away close up to the skin of the animal by the action of the salt water. A little rubbing revealed the name.

"During the war of the rebellion, in 1861, Charleston was blockaded by the federal fleet. The blockade-runners again and again successfully eluded the fleet and carried supplies to the beleaguered city. To stop this the federal government bought a number of old whalers that were lying in the harbor of New Bedford, patched them up and sent them to Charleston filled with stones, and sank them across the entrance to the harbor. The vessels have been known ever since as the 'stone fleet,' and the *Montezuma* was one of them. This was thirty years ago, and the *Montezuma* was built sixty years prior to that. She was at one time a British man-of-war, and was bought by New Bedford people and turned into a whaler. It will thus be seen that it is safe to say that the harpoon head found by the *Beluga* had been carried by the whale fully thirty-six years. Ever since whaling became an industry it has been the custom for each whaling firm to have the name of the vessel stamped on each harpoon. This is done in case two or more boats from different vessels should be surrounding one of the animals, in order to show which of the vessels has struck it, if the animal gets away and is afterward found dead."

The following note from Captain Knowles, of the Pacific Steam Whaling Company, was attached to the harpoon when presented to Senator Perkins:

"Harpoon head found in a whale taken in Bering sea in August, 1890, by steam whaling bark *Beluga*, Captain R. D. Wicks, of the Pacific Steam Whaling Company's fleet. This iron was from the whaling bark *Montezuma*, as you will see by the mark. The *Montezuma* was sunk in Charleston harbor during the war of the rebellion. She was in Bering sea some ten years previous to being sold to the government, so this iron must have been in the whale forty years. J. N. KNOWLES."

I was discussing the matter recently with Capt. E. P. Herendeen, of the U. S. National Museum, and mentioning cases reported where whales struck in Greenland waters had got away and afterward been taken in Bering strait with the first iron in them, or *vice versa*, when Captain Herendeen observed:

"In regard to the whale iron or harpoon found in a whale with the name of a ship on it which had never been in the Greenland fisheries and had always been employed in this industry in the region of Bering strait, I can only say that while it is most likely that the whale does make the passage from the vicinity of Point Barrow to the waters around Greenland and Hudson bay, still I do not think the evidence of the irons conclusive, for the following reasons: Ships were often changing ownership and being withdrawn from the service and their inventory of whaling implements sold and put on board other ships, and while it is true that the ship receiving such weapons would erase the marks of the former ship *if put in use*, there remains the possibility of such irons being given or traded to the Eskimo, and such a whale may have been struck by an Eskimo in the vicinity of its final capture with a second-hand iron from which the name had not been erased.

"We know that the ships of the Franklin search expedition approached very near each other to the east of Banks land, and we know the whale is able to make long journeys beneath the summer ice floes, for they easily see any places where the light shows through the ice, which denotes a possible breathing place.

"I have often heard whales blowing among the ice when I could not see any sign of water anywhere."

These notes appear to have a certain interest on account of the stories current from time to time of whales supposed to have made the northwest or northeast passage, and also throw light on the possible age which may be attained by these animals.

WM. H. DALL.

SHIPBUILDING IN THE UNITED KINGDOM IN 1898

Lloyd's returns of shipbuilding show that, exclusive of warships, 761 vessels of 1,367,570 tons gross (viz., 744 steamers of 1,363,318 tons and 17 sailing vessels of 4,252 tons) were launched in the United Kingdom in 1898. The warships launched at both government and private yards amounted to 41 of 191,555 tons displacement. The total output of the United Kingdom for the year was, therefore, 802 vessels of 1,559,125 tons.

The total output of the world during 1898 (exclusive of warships) appears to have been about 1,893,000 tons (1,779,000 steam, 114,000 sail). Lloyd's Register Wreck Returns show that the tonnage of all nationalities totally lost, broken up, etc., in the course of 12 months amounts to about 733,000 tons (328,000 steam, 405,000 sail). It will thus be seen that, while the sailing tonnage of the world has been reduced by about 290,000 tons during 1898, the steam tonnage has increased by about 1,450,000 tons. The net increase of the world's mercantile tonnage is, therefore, 1,160,000 tons.

The output of the year in the United Kingdom has surpassed all earlier records. In some previous returns of this kind the figures for 1889 have been taken for comparative purposes as a rough approximation to the maximum productive capacity of the shipbuilding yards of the United Kingdom. The fact that the output of that year has now been exceeded by 158,000 tons as regards merchant vessels, and by upward of 150,000 tons as regards war vessels, indicates alike the remarkable character of the year's work and the great resources of British shipbuilders.

Comparing the present returns with those for the past two years it will be seen that the tonnage launched in 1896 and 1897 was less by 208,000 tons and 415,000 tons respectively than that launched in 1898. Concurrently with this increased output of mercantile tonnage during 1898 the 1897 figures for war vessels have been doubled, and those for 1896 have been exceeded by 28,000 tons.

It is noteworthy, moreover, that the output of 1898 is, with inconsiderable exceptions, entirely composed of steam tonnage. . . . Of the total output 1,057,775 steam tons and 3,867 sailing tons, or 1,061,642 tons in all (nearly 78 per cent), belong to ports in the United Kingdom. In this connection it may be noted that the losses, etc., of United Kingdom vessels during 12 months are shown by Lloyd's Register Wreck Returns to average 276,000 tons (194,000 steam, 82,000 sail). Sales to foreign and colonial owners for the 12 months ended October, 1898, reached the large total of 563,000 tons (426,000 steam, 137,000 sail). On the other hand, purchases from foreign and colonial owners during the same period amounted to 104,000 tons (100,000 steam, 4,000 sail). The sailing tonnage of the United Kingdom would thus appear to have decreased by about 211,000 tons, while the steam tonnage has increased by 538,000 tons. The net increase of United Kingdom tonnage during 1898 is therefore about 327,000 tons. This figure exceeds the similar estimates for 1895,

1896, and 1897 by 198,000 tons, 110,000 tons, and 279,000 tons respectively. Of the vessels launched in the United Kingdom 654 of 1,131,237 tons have been built under the society's inspection with a view to classification in Lloyd's Register Book.

As regards the movements of the shipbuilding industry during the course of 1898, Lloyd's Register Returns show that, irrespective of warships, the total tonnage under construction in the United Kingdom on December 31, 1898, exceeded by about 387,000 tons, or over 38 per cent, that under construction 12 months previously.

GEOGRAPHIC LITERATURE

The Educational Series of Rock Specimens Collected and Distributed by the United States Geological Survey. By Joseph Silas Diller. Pp. 400, with 65 illustrations. Bulletin No. 150. U. S. Geological Survey, Charles D. Walcott, Director. Washington, 1898. 25 cents.

A good many years ago Major J. W. Powell, then Director of the Geological Survey, conceived the happy idea of distributing among the leading educational institutions of the country collections of specimens of typical rocks for use in the study of certain branches of geology. The collection, classification, and distribution of the material was an undertaking of no small magnitude, and it is only recently that it has been completed. Concurrently with such completion there has been published a treatise on the study of rocks, in which the educational specimens are minutely described—69 of them by Mr J. S. Diller, who has been almost wholly responsible for their selection and arrangement, and 87 by other well-known geologists. While fulfilling in a way that leaves nothing to be desired its primary function as a handbook to the mineral collections, this work has an educational value that is entirely its own, as an attractively written and handsomely and instructively illustrated manual to the study of lithology and petrography. With a courage and good sense worthy of general emulation, Mr Diller, although dealing with an exceedingly technical subject, has not disdained to make himself intelligible to the non-scientific reader, some of his definitions even recalling Huxley's famous Norwich lecture "On a Piece of Chalk," that marvelous example of lucid exposition which every scientific writer reaching out to a popular audience may with so much advantage make his model.

J. H.

The Mechanical Composition of Wind Deposits. By Johan August Udden. Pp. 69. Rock Island, Illinois. 1898.

A few years ago, Dr Johannes Walther, a distinguished German geographer and traveler in many lands, visited this country, and became interested in the efficiency of our western winds in geographic development. He was especially impressed with the work of the winds in erosion; and, in a widely-quoted article in THE NATIONAL GEOGRAPHIC MAGAZINE, he described this agency appreciatively, designating it deflation. Now comes Professor Udden, of Augustana College, with a still more elaborate memoir dealing with the work of the wind as an agent of

transportation and deposition. His inquiry was suggested, and indeed started, by a question of the eolic origin of the loess of the Mississippi valley; afterward it extended to dunes and other deposits of drifted sand; still later he turned his attention to the air itself, devised ingenious appliances for collecting atmospheric dust, and proceeded to examine and sort the material with infinite patience. The various materials from dunes and lee-slopes and air were classified into groups or grades of eleven diameters, and the quantities (including, of course, the relative proportions of each) were carefully determined, and are represented graphically in the memoir. The determinations indicate that the wind is an assorting agent of great delicacy; for the range in magnitude of particles in any particular deposit is slight and consistent. The general result of the study is to establish criteria for discriminating wind deposits and ascertaining the conditions under which they were laid down. The bearing of the inquiry on the origin of the much-discussed loess of the Mississippi valley is noted, though Professor Udden judiciously refrains from final expression; it may be hoped that his excellent work will stimulate corresponding investigation of the mechanical composition of glacier mud and river silt. Professor Udden's memoir is bound to become a standard.

W J M.

Twelfth Annual Report of the Interstate Commerce Commission. Advance copy without appendices. Pp. 91. Washington, January 11, 1899.

Tenth Annual Report on the Statistics of Railways in the United States for the year ending June 30, 1897. Prepared by the Statistician to the Commission. Advance copy without tables. Pp. 114 and map.

The announcement of the practical failure of the interstate commerce law contained in the Eleventh Annual Report of the Commission was so distinct and unequivocal that it has been difficult to anticipate what would be added after another twelve months of legislative inaction. In the language of the present report, "to state that the law in its present condition cannot be enforced is only to repeat what has already been said," and the commission, after a brief though emphatic characterization and a few pertinent illustrations of the situation as it was at the close of 1898, passes to the discussion of practicable remedies. Comparing the rather definite intimations in this connection with the significant omissions in that of last year, one feels warranted in describing the later emission as a record of the progress of the commission toward a fuller appreciation and fairer expression of the necessities of the railway situation and of the fact that railway corporations and investors have rights to protect as well as duties to perform. It is not that the recommendations of last year's report were in themselves objectionable, or that they reappear substantially altered in form or substance; it is rather the change in the order in which they are presented and the transference of emphasis that is remarkable and significant. Last year there was a great deal in regard to the power to correct rates, the imperfections of the long and short haul clause, the lack of finality accorded the proceedings before the commission, but very little concerning the desirability and means of restraining competition, and that little expressed in exceed-

ingly indefinite and general terms. The following extracts from the present report are expressed in terms neither indefinite nor unnecessarily general.

"A railroad is essentially a monopoly. This is literally true as to all local points upon its line which are reached by it alone. It is only at competitive points—that is, at points where traffic can be carried by two or more lines—that the railroads become actual competitors. It results from this fact that, as a rule, competitive points gain at the expense of non-competitive points. . . . The natural result of railway competition, it may be fairly said, is to create preferences between localities.

. . .

"The same thing is true of preferences between individuals. . . . Considered *a priori*, therefore, we should expect that railway competition would produce preferences and discriminations between communities and between persons. What might to a large extent be expected has actually occurred beyond all legitimate excuse.

"One of the outcomes of these railway abuses was the act to regulate commerce. The purpose of that act was largely to do away with preferences and discriminations. It also aimed to keep alive competition between railways by prohibiting pooling arrangements. In other words, it endeavored to eradicate the results and to perpetuate the cause. . . . To one familiar with actual conditions it seems practically out of the question to establish rates that are relatively just without conference and agreement; but when rates have once been established the act itself requires that they shall be observed until changes are announced in the manner provided. Certainly it ought not to be unlawful for carriers to confer and agree for the purpose of doing what the law enjoins. . . . The logical way to remove these evils would be to remove their cause. If unrestricted competition produces discrimination, one obvious way to prevent such discrimination is to restrict competition. . . . We are inclined to think . . . that time has demonstrated the futility of attempting by criminal enactments to secure absence of discrimination in railway rates so long as independent ownership and unrestrained competition exists. We are inclined to think that competition should be restricted; but if the railroads are allowed to agree for that purpose, such conditions should be imposed as will fully protect the public interest."

While the ideas of the commission have developed they have not vacillated. The conditions which must be imposed in the interest of the public are those that were advocated a year ago, though it is now easier to discover the broad and intelligent spirit of compromise which no one doubts will lead the commission, whenever amendatory legislation can be secured, and would have led it at any time in the past, to make every reasonable concession which will not endanger the rights of the public.

The report contains the usual review of the year's work in railway regulation and a brief historical sketch of traffic associations.

It is rather curious that the attention of the commission does not appear to have been directed to the very remarkable and unusually successful Chicago-Omaha pool, which antedated by four years the "Saratoga conference," and, unlike the latter, produced substantial results. It was an investigation of the operations of this pool that led the Railroad Commission of Iowa to declare that pools constitute "the only agency that can compel the through traffic to bear, as it should, its proportion of the interest on the cost of maintaining and operating the roads."

One turns with relief from the report of the commission, with its disheartening record of legislative inefficiency and inertia, to the report of

its statistician. The formal excellence of the latter leaves nothing to be desired, and the most critical statistician might well prefer to expend whatever space can be given for review in praise rather than to call attention to its few shortcomings. It is no fault of Professor Adams that this report affords so incomplete a presentation of the transportation business, that the accounts upon which it is based are by no means uniform, that important agencies of railway transportation are excluded, that it appears eighteen months after the close of the year to which it relates, or that many of its averages are based upon such widely divergent facts as to be much less representative of actual conditions than is both practicable and desirable. These imperfections and inadequacies also are results of legislative inertia. Until the frequently repeated recommendations of the statistician on these points receive the attention they merit, he will be powerless to secure better results in either of these particulars.

The statement that less work was done during 1896–'97 "by both passenger and freight locomotives than during any previous year of which this office has record," on page 24, is not supported by the summary to which it refers on page 23. The latter shows the work of passenger locomotives to have been greater than during 1895, and that of freight locomotives greater than during 1894 or 1895. It is difficult to believe that Professor Adams would claim that any considerable value attaches to the figure alleged to represent capitalization of new mileage given on page 49, or to the average derived therefrom. The foot-note on the same page is also of questionable accuracy, as it very materially understates the probable effect of changes in capitalization due to reorganizations.

Exception must be taken also to the statement on page 61 that there has been no reduction in railway passenger charges corresponding with that in freight rates. While verbally accurate, this is not unlikely to mislead those who are not students of transportation. The movement of an article of freight between any two points is part of a commercial transaction that cannot be very materially varied. There are differences in safety and speed; but common carriers have always been insurers of the goods they move, while the acceleration of the speed of freight trains, even within the past fifty years, is a matter of more importance to the railways in enabling them to handle increased traffic than to ordinary shippers. The service of moving an individual by rail does, on the other hand, admit of changes of great importance. Safety is a primary consideration which no insurance can eliminate, while time and general comfort en route are elements of scarcely secondary importance. American travelers have demanded and obtained improved facilities, superior signaling apparatus and other safeguards, more comfortable cars and more rapid trains, rather than actual decreases in rates; but the purchasing power of their dollars, in connection with passenger transportation, has none the less increased. One can illustrate this by comparing the charges for such services with those for hotel accommodations during former and recent years. When in 1848 the novel luxury and unprecedented splendor of the Astor House were greater marvels to the transient visitor to New York than is the Waldorf-Astoria to his least sophisticated successor, the rate per diem for meals and room at the former was but two dollars. The

railway rate at that time from New York to Boston was just what it is today, though it is undeniable that the inferiority of the railway accommodations to those of the present time was much greater than that of the Astor House to the finest hotel of the present. At the same time the journey by rail from New York to Philadelphia required five hours and cost four dollars, while the rate is now $2.50 and the trip can be accomplished in two hours.

H. T. NEWCOMB.

PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY, SESSION 1898–'99

Special Meeting, December 9, 1898.—Acting-President McGee in the chair. The chairman announced the election to honorary membership of the President of the United States, and stated that the committee—consisting of the Acting-President, the Secretary, Col. H. F. Blount, Mr C. J. Bell, and Prof. Willis L. Moore—appointed to notify President McKinley of the action of the Society, called at the Executive Mansion on December 8 and tendered to the President the certificate of election, at the same time explaining to him that it was the design of the Society to signalize the beneficent changes of the year in the modification of the civil geography of the world, and that the action was to be understood as an indorsement by one of the leading scientific organizations of the country of the course of the President as a great national leader. The President, the chairman continued, accepted the election and expressed his high appreciation of it, especially as coming from the most conservative class of citizens. Characteristically disclaiming credit for the recent extension of enlightenment by means of changes in civil geography, he observed that the results flowed from the efforts of an entire people, among whom he was but a single individual; he added that the full extent of the changes could not be stated pending the completion of the Treaty of Paris, remarking, however, that the last direct advices were favorable. He also explained that only the pressure of public business would prevent him from attending the ensuing meeting of the Society. The announcement of the election of the President was received with applause.
Hon. Robert Adams, Jr., M. C., U. S. Minister to Brazil, 1889–'90, gave a lecture on Brazil and its Revolution, illustrating his remarks by numerous colored lantern slides.

Regular Meeting, December 16, 1898.—Acting-President McGee in the chair. Col. F. F. Hilder gave an illustrated lecture on Fashoda and the Valley of the Nile.

Special Meeting, December 23, 1898.—Acting-President McGee in the chair. Mr H. W. Turner, U. S. Geological Survey, delivered an address on the Yosemite and the High Sierra, and discussed the origin of their topographical features. The lecture was illustrated by lantern slides.

Special Meeting, January 6, 1899.—Acting-President McGee in the chair. Mr Willard D. Johnson, U. S. Geological Survey, gave an illustrated lecture on Glaciers and their Work in High Mountains.

Regular Meeting, January 13, 1899.—President Bell in the chair. The Rev. David Macrae, of Scotland, gave an illustrated lecture on the National Characteristics of the English, Scotch, and Irish.

Special Meeting, January 20, 1899.—President Bell in the chair. Mr Gifford Pinchot gave a lecture on the Protection and Administration of our Public Forests, illustrating his remarks by lantern slides showing the various forest reserves of the United States.

Regular Meeting, January 27, 1899.—President Bell in the chair. Mr Arthur P. Davis, U. S. Geological Survey, gave an illustrated lecture on the Hydrography of Nicaragua.

ELECTIONS.—New members have been elected as follows:

December 16, 1898.—Amos Reed Buck, Miss Virginia Butler, General James A. Dumont, R. H. Duncan, E. W. Gould, Hon. J. L. Slayden, M C., Alonzo H. Stewart, Miss M. B. Warren.

December 23, 1898.—Rev. Wilbur F. Crafts, Dr Basil H. Dutcher, Louis H. Perley, Prof. Frank J. Polley, Dr William L. Ralph, George T. Roberts, Miss Lewanna Wilkins.

January 3, 1899.—Dr C. Evelyn Gilbert, Henry Cleveland Perkins, Miss Margaret P. Smith.

January 13, 1899.—Albert H. Bumstead, Miss M. R. Hays, A. J. Henry, Gust. Moser, Mr Tam Ye.

January 27, 1899.—E. Eckfeld, Mrs Emily J. Harris, Mrs W. Keiller, Miss Estell Reel, Henry E. Sawyer, Mrs Fanny Bullock Workman.

MAJOR JED HOTCHKISS

Major Hotchkiss died at his residence in Staunton, Virginia, on January 17. He was prominent as a topographer and mining geologist, his researches being mainly devoted to the development of the resources of the Virginias, in which work he has borne a very prominent part. During the Civil war he served as topographer upon the staffs of Generals Robert E. Lee and "Stonewall" Jackson, and prepared most of the maps with which these officers conducted their campaigns.

The maps of Virginia, between the time of the Civil war and the recent work of the United States Geological Survey in that state, were due almost entirely to Major Hotchkiss' work. On the death of William B. Rogers, leaving much of his work as State Geologist of Virginia unpublished, Major Hotchkiss was selected by Mrs Rogers to prepare the results of her husband's work for publication.

Major Hotchkiss has been a member of the National Geographic Society from its organization and has contributed largely to the success of its lecture courses and excursions. Many members will recall the delightful trip to Shendon, Virginia, on which occasion Major Hotchkiss was the host, and entertained the Society with true Virginia hospitality. The Society owes much to him. Personally and socially he was one of the most genial and lovable of men.

His health had been failing for some time when he was attacked by meningitis, resulting in his sudden death. H. G.

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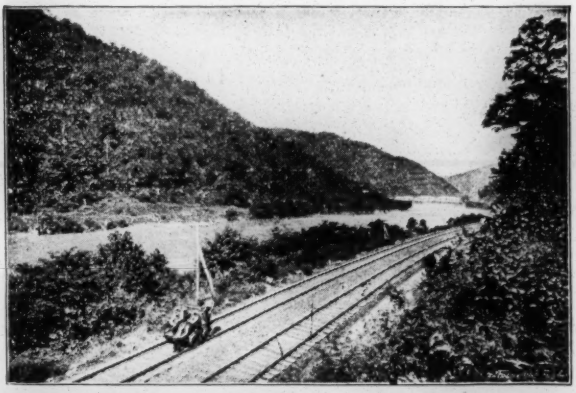

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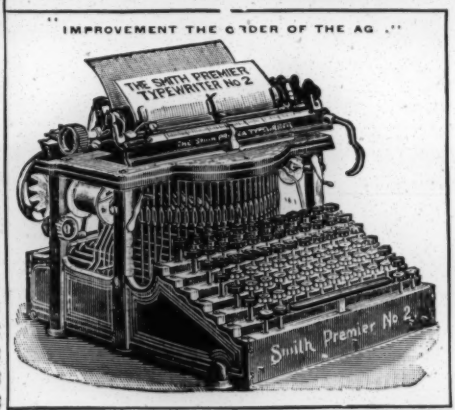

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